**To:** Qazzaz, Bilal[qazzaz.bilal@epa.gov]
**From:** Papp, Michael
**Sent:** Fri 11/7/2014 1:28:50 PM
**Subject:** FW: Precision and Bias Checks

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;;;;
Here you go

**From:** Papp, Michael
**Sent:** Thursday, November 06, 2014 1:07 PM
**To:** McGrath, Jesse
**Subject:** RE: Precision and Bias Checks

No I'm tired of this take a look at our data and monitoring orgs are not doing their work. They continue week after week to miss their 1-point QC checks because there is some apathy out there, people are not trained and folks are not taking any corrective action.

These validation templates were developed by monitoring organizations for monitoring organization and since 2008 they identified critical criteria . There was consensus agreement with these. Now that the doors are open a bit and people are not following them we are scurrying around for solutions and changing or stance. Below is an example of what we are seeing. this is from VA for ozone where the 1-point QC is 7%. The first time they got a -10.4 they should have done something but they did not. IF THEY HAD DONE SOMETHING RIGHT AWAY WE WOULD NOT BE WORRYING ABOUT STATISTICAL APPROACHES TO SALVAGE THE DATA. They point is, fix it when you see it and it does not become a problem. Let it go and then everyone starts searching for a way to get around the problem.

PEP results are not critical criteria… collocated precision is not a critical criteria so those you have more leeway on what you need to look at to validate.. So I'm only talking about those checks that are accomplished most frequently and are critical criteria. There is a little out by providing a compelling reason for keeping data out of critical criteria but you should not be seeing what's occurring below.

## $O_3$ Assessments

| Site ID: {Enter Site ID} | | Pollutant type: $O_3$ | | | | | $CV_{ub}$ (%) | Bia |
|---|---|---|---|---|---|---|---|---|
| Meas Val (Y) | Audit Val (X) | d (Eqn. 1) | 25th Percentile | $d^2$ | \|d\| | $\|d\|^2$ | | |
| 85.1 | 91.1 | -6.586 | -8.750 | 43.378 | 6.586 | 43.378 | | |
| 81.6 | 91.1 | -10.428 | 75th Percentile | 108.745 | 10.428 | 108.745 | n $S_d$ $S_{d2}$ | |
| 83.4 | 92.4 | -9.740 | -5.262 | 94.873 | 9.740 | 94.873 | 15 4.557 52.464 | |
| 84 | 92.4 | -9.091 | | 82.645 | 9.091 | 82.645 | n-1 $\Sigma d$ $\Sigma d^2$ | |
| 87.4 | 92.4 | -5.411 | | 29.282 | 5.411 | 29.282 | 14 -103.151 1000.072 | |
| 78.4 | 92.4 | -15.152 | Outlier | 229.568 | 15.152 | 229.568 | | |
| 85.4 | 92.4 | -7.576 | | 57.392 | 7.576 | 57.392 | | Bia |
| 85.4 | 92.4 | -7.576 | | 57.392 | 7.576 | 57.392 | | |
| 80.6 | 88 | -8.409 | | 70.713 | 8.409 | 70.713 | CV (%) (Eqn 2) | Sig |
| 83.5 | 88 | -5.114 | | 26.149 | 5.114 | 26.149 | 6.11 | -8.9 |
| 83.5 | 88 | -5.114 | | 26.149 | 5.114 | 26.149 | | |
| 80.8 | 88 | -8.182 | | 66.942 | 8.182 | 66.942 | Upper Probability Limit | Lov |
| 81.5 | 88 | -7.386 | | 54.558 | 7.386 | 54.558 | 2.06 | |
| 93.5 | 88 | 6.250 | Outlier | 39.063 | 6.250 | 39.063 | | |
| 84.8 | 88 | -3.636 | | 13.223 | 3.636 | 13.223 | | |

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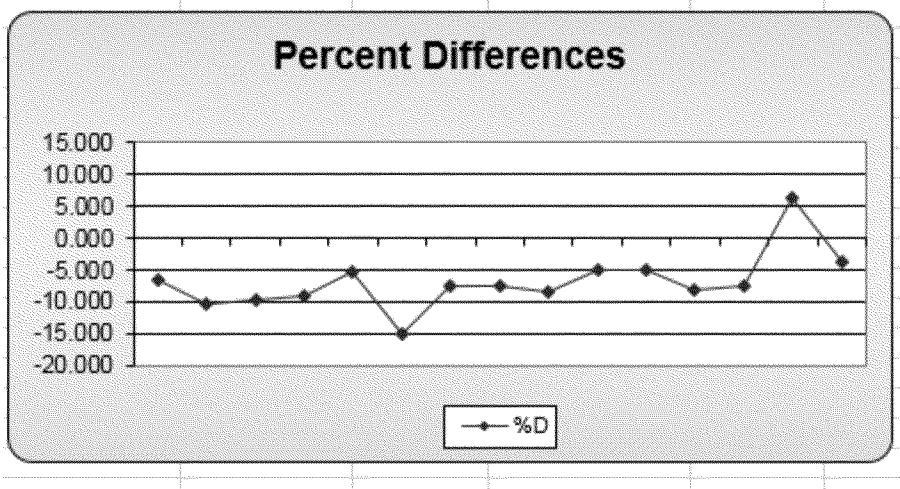


**From:** McGrath, Jesse
**Sent:** Thursday, November 06, 2014 12:44 PM
**To:** Papp, Michael
**Subject:** RE: Precision and Bias Checks

Based on my experience outside the agency I'd argue not to do that. Can you check this with a statistician? I've checked with several and I get essentially this answer every time:

Removing a QA point based solely on its extremity will bias the estimate of whatever you're trying to measure. This is exactly what Illinois did when they invalidated their PEP results simply for being outside the limit. Their actual bias was not great, but by removing any indication that they were failing the estimate looked fantastic.

The data "between" two points have no specific ties to those points, so by removing them you're also increasing the error in whatever you're trying to measure.

It's exactly the same for precision and I have a presentation to demonstrate this visually. Unless you can demonstrate a quantifiable issue with the monitor that you have control over then the precision point must be assumed to represent your precision.

I think the reason most people don't believe you can invalidate PM2.5 data based on collocation pairs is because they're more aware of the checks that would invalidate the data, e.g. flow and leak checks. But with the gaseous monitors it's usually lamps, internal temp, or other things that QA people are less aware of.

The 1-point checks are indicators of those other parts of the system. When those parts fail, so will the precision check. But if the check is out and there is no other failure you're actually measuring an uncommon, but legitimate, value of your precision.

**From:** Papp, Michael
**Sent:** Thursday, November 06, 2014 11:30 AM
**To:** McGrath, Jesse
**Subject:** RE: Precision and Bias Checks

That's what the guidance says

**From:** McGrath, Jesse
**Sent:** Thursday, November 06, 2014 11:57 AM
**To:** Papp, Michael
**Subject:** RE: Precision and Bias Checks

Are you interpreting that to mean that in the absence of any other cause the precision point alone is justification for invalidating the data?

**From:** Papp, Michael
**Sent:** Thursday, November 06, 2014 5:53 AM
**To:** McGrath, Jesse
**Subject:** Precision and Bias Checks

From the validation template

*Observations that do not meet each and every criterion on the* ***Critical Criteria Table*** *should be invalidated unless there are compelling reason and justification for not doing so. The sample or group of samples for which one or more of these criteria are not met is invalid until proven otherwise. The cause of not operating in the acceptable range for each of the violated criteria must be investigated and minimized to reduce the likelihood that additional samples will be invalidated.*

Any check listed as critical should be invalidated back to the last acceptable check. We may allow one check that just over the acceptance limit in but that's up to you.

The requirements are pretty clear. Some have abused this and now are paying the price.

Now there are other precision check (Like PM2.5 collocation) that represent a grander scale of precision for the PQAO that is not critical but operational. In this case you have more leeway to trouble shoot to determine issues.

A failure of an NPAP audit by itself would not be cause for invalidation but further follow-up. Hope this helps.

Mike Papp

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